DEQ MEMO:
Calculation of a Basic Site Specific Target Soil Concentration* (TSC):

To: Keith Large **From: Jason Seyler** **Date: October 31, 2011**

When calculating a TSC one must first run a SPLP and concurrent soils analysis. The SPLP result will provide you with the amount of COC that is leached into solution at a pH simulating normal precipitation. The soil concentration will provide you with the soil concentration that results in the leaching of the COC analyzed in the SPLP result.

The ratio between the total soil concentration and the COC concentration reported by the SPLP analysis is the soil-water partition coefficient (K_d) and is calculated as follows:

$$K_d = \frac{C_s}{C_w}$$

where K_d = Freundlich soil-water partition coefficient (L/kg)
C_s = concentration sorbed on soil (mg/kg)
C_w = solution concentration (mg/L)

Multiplying the COC's DEQ-7 value (or C_w) by the site specific K_d results in the calculated TSC (or C_t):

$$C_t = C_w * K_d$$

where: C_t = site specific target soil concentration (mg/kg)
C_w = target soil leachate concentration (mg/L)
K_d = soil-water partition coefficient (L/kg)

Once a TSC is calculated it can then be multiplied by an appropriate dilution attenuation factor (DAF). DEQ has adopted a generic statewide DAF of 10. This conservative assumption assumes a contaminated source is located immediately above the water table (0.1-meter above the water table). If the groundwater were greater than 0.1 meters below the source area a greater DAF would be expected.

A site specific DAF can be calculated based upon the following formula:

$$DF = 1 + \left(\frac{Kid}{IL}\right)$$

where: K = aquifer hydraulic conductivity (m/yr)
i = aquifer hydraulic gradient (m/m)
d = aquifer mixing zone depth (m)
I = infiltration rate (m/yr)
L = Source Length (m)

(*Please note this is a basic calculation and an even more thorough evaluation can be calculated with more site specific information on water-filled soil porosity, air-filled soil porosity, dry soil bulk density, and Henry's law constant).

Stimson Lumber - Bonner, MT **Target soil concentration [mg/kg] w/ DAF 10 =** (Soil [ ] * MCL)/SPLP [ ] * DAF 10

Stockpiles SPLP (leachability) results:

Location	Sample #	PCBs [ppm]	SPLP PCBs [ug/l]	MCL PCBs [ug/L]	Target soil concentration [mg/kg] w/ DAF 10
JunkPile S-cntr	JP-C	2.9	< 0.50	0.5	29
JunkPile SW	JP-W	3.3	1.2	0.5	**13.75**
Screened pile N-cntr	SS-C	10	0.62	0.5	80.65

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